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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/520,028	12/28/2004	Yoichi Nakagawa	MAT-8645US	9202

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EXAMINER	
MALEK, LEILA	

ART UNIT	PAPER NUMBER
2611	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/520,028	NAKAGAWA ET AL.	
	Examiner	Art Unit	
	Leila Malek	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 January 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 December 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *12/28/2004 and 03/06/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claims for foreign priority under 35 U.S.C. 119(a)-(d). The certified copies have been filed in parent Application No. 10/520028, filed on 12/28/2004.

Information Disclosure Statement

2. The information disclosure statements (IDS) submitted on 12/28/2004 and 03/06/2006 are being considered by the examiner.

Drawings

3. The drawings are objected to because elements of Figs. 3-5, 7, 9-11, 13, 16, 17, 21, and 22 have not been properly labeled. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the

changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

4. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

5. Claims 1-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. As to claim 1, Applicant in the preamble recites "Transmitting apparatus comprising:", however the body of the claim is directed to a device for receiving a carrier modulation signal, which is a definition of a receiver. Therefore the claim is vague.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 13, 14, and 16 are rejected under 35 U.S.C. 102(e) as being anticipated by Doberstein et al. (hereafter, referred as Doberstein) (US 6,424,678).

As to claim 13, Doberstein discloses a propagation parameter estimation means (see Fig. 6, block 618) for estimating a propagation parameter from a receiving signal (see column 8, lines 27-31); and a symbol determination means (see block 616) for reconstructing a transmitting data based on the propagation parameter.

As to claim 14, Doberstein further discloses a carrier separation means for separating the receiving signal, which is configured by multiple carriers, into a plurality of sub-carriers (see Fig. 6, blocks 610, 612, and 614), wherein: a propagation parameter estimation means estimates a propagation parameter for each of the sub-carriers (see block 618 and claim 5) and the symbol determination means (see block 616) reconstructs a transmitting data from the receiving signal for each of the sub-carriers.

As to claim 16, Doberstein further discloses an antenna element 602 (see Fig. 6), wherein said propagation parameter estimation means (see block 618) estimates the propagation parameter for that antenna.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1, 2, and 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hudson (US 2002/0176485), in view of Guey et al. (hereafter, referred as Guey) (US 6,876,645).

The examiner would like to call the attention of the applicants that, in view of the rejection of claims 1-12 under 35 U.S.C. 112, 2ND paragraph, see above, the examiner has interpreted the claims to be directed to a receiver not a transmitter because all of the limitations in the body of the claims are directed to a receiver. As to claim 1, Hudson discloses an apparatus comprising: a. an array antenna (see paragraph 0041) including M (M is an integer of 2 or more) pieces of antenna elements (i.e. the definition for array) for receiving a carrier modulation signal (see paragraph 0054)of a known symbol that is transmitting from a radio station (see paragraph 0040); b. a reference symbol generation means (see Fig. 3, block 260 and paragraph 0061) for generating a reference symbol that gives a phase reference and is the same symbol with the known symbol; c. a propagation channel estimation means (see Fig. 3, blocks 266 and 268) for generating M pieces (see paragraph 0041) of receiving symbols from a signal received at the antenna elements based on the reference symbol, wherein the receiving symbols are estimate values for a complex propagation channel between a transmitting antenna and the array antenna. Hudson discloses all the subject matters claimed in claim 1, except that the incoming signal has been converted to baseband. Guey, in the same field of endeavor, discloses a communication system comprising a plurality of down-converters to down-convert the received signal to baseband signals (see the abstract and column 2, lines 20-30). It would have been obvious to one of ordinary skill in the art

at the time of invention to modify Hudson as suggested by Guey to recover the baseband signal transmitted by the transmitter.

As to claim 2, , Hudson further discloses a carrier separation means for separating the baseband signal received at the M pieces of antenna elements into N (N is an integer of 2 or more) pieces of sub-carriers (see paragraph 0041), wherein: the carrier modulation signal is configured by multiple carriers, and the carrier separation means, after separating the received signal into N (N is an integer of 2 or more) pieces of sub-carriers, generates "M*N" pieces of receiving symbols (see Fig. 7) that are estimate values of a complex propagation channel based on the reference symbol (see paragraph 0041).

As to claims 4 and 5, Hudson further discloses that the M pieces of antenna elements configuring the array antenna have a mutually-different directional pattern (see paragraph 0052).

8. Claims 3 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hudson and Guey, further in view of Subramanian (US 5,361,276).

As to claim 3, Hudson further discloses that the received signal has been de-spreaded by using a RAKE despreader 142. However, neither Hudson nor and Guey disclose that there are N pieces of spread codes that makes the propagation channel estimation means, after applying a reverse spread separation process to the baseband signal received at the M pieces of antenna elements with the spread codes, to generate "M*N" pieces of receiving symbols that are estimate values of a complex propagation channel based on the reference symbol. Subramanian discloses a communication

system comprising a rake demodulator 108, wherein the rake demodulator has been configured to de-spread the received signals with different spreading codes (see Fig. 3 and column 5, lines 45-49). Subramanian does not expressly disclose generating "M*N" pieces of receiving symbols that are estimate values of a complex propagation channel based on the reference symbol, however after modifying the despreader 142 as taught by Subramanian the output of the despreader 142 would be "M*N" pieces of receiving symbols that are estimate values of a complex propagation channel based on the reference symbol. It would have been obvious to one of ordinary skill in the art at the time of invention to modify Hudson and Guey as suggested by Subramanian to despread the received signal more accurately and extract the signals transmitted from the transmitter.

As to claim 6, Hudson further discloses that the M pieces of antenna elements configuring the array antenna have a mutually-different directional pattern (see paragraph 0052).

9. Claims 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doberstein in view of Vook et al. (hereafter, referred as Vook) (US 6,834,043).

As to claim 15, Doberstein does not expressly disclose that the sub-carriers are any one of an OFDM signal that is so configured as to be mutually-orthogonal in a frequency space. Vook discloses a communication system comprising propagation parameter estimation means (see Fig. 2, block 208) for estimating a propagation parameter from a receiving signal; and a symbol determination means (see blocks 202 and 206) for reconstructing a transmitting data based on the propagation parameter.

Vook further discloses that there is a carrier separation means for separating the receiving signal wherein the sub-carriers are any one of an OFDM signal that is so configured as to be mutually-orthogonal in a frequency space (see the abstract and Fig. 4). It would have been obvious to one of ordinary skill in the art at the time of invention to use OFDM technology as suggested by Vook to increase the performance of the communication system.

As to claim 17, Doberstein further discloses an antenna element 602 (see Fig. 6), wherein said propagation parameter estimation means (see block 618) estimates the propagation parameter for that antenna.

10. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doberstein and Hudson, further in view of Guey.

As to claim 18, Doberstein discloses a propagation parameter estimation means (see Fig. 6, block 618) for generating a receiving symbol that is a complex symbol (see Fig. 1, blocks 124 and 126); and a symbol determination means (see block 616) for reconstructing a transmitting data based on the propagation parameter (i.e. a predetermined criteria). Doberstein does not expressly disclose that the propagation channel estimation means applies orthogonal detection to a received baseband signal. Hudson, in the same field of endeavor, disclose an apparatus comprising: a propagation channel estimation means (see Fig. 3, blocks 266 and 268) for generating M pieces (see paragraph 0041) of receiving symbols from a signal received at antenna elements based on the reference symbol, wherein the receiving symbols are estimate values for a complex propagation channel between a transmitting antenna and the array antenna.

Hudson further discloses that channel estimation means applies orthogonal detection to a received signal (see the abstract, paragraphs 0001, 0011, 0038, and 0040). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Doberstein as suggested by Hudson to provide an accurate channel estimation results. Hudson does not disclose that the incoming signal has been converted to baseband. However, Guey, in the same field of endeavor, discloses a communication system comprising a plurality of down-converters to down-convert the received signal to baseband signals (see the abstract and column 2, lines 20-30). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Doberstein and Hudson as suggested by Guey to recover the baseband signal transmitter by the transmitter.

As to claim 19, Doberstein further shows that the propagation parameter estimation means (See Fig. 6, block 618) generates the receiving symbol for each of the sub-carriers after the carrier separation means (see blocks 610, 612, and 614) separates the signal into the sub-carriers.

11. Claims 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doberstein, Hudson and Guey, further in view of Subramanian.

As to claim 20, Hudson further discloses that the received signal has been de-spreaded by using a RAKE despreader 142. However, Doberstein, Hudson and Guey do not disclose that there are N pieces of spread codes that make the propagation channel estimation means, after applying a reverse spread separation process to the baseband signal received at the M pieces of antenna elements with the spread codes.

Subramanian discloses a communication system comprising a rake demodulator 108, wherein the rake demodulator has been configured to de-spread the received signals with different spreading codes (see Fig. 3 and column 5, lines 45-49). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Doberstein, Hudson and Guey as suggested by Subramanian to despread the received signal more accurately and extract the signals transmitted from the transmitter.

12. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Doberstein, Hudson and Guey, further in view of Bruekers et al. (hereafter, referred as Bruekers) (US 2002/0105907).

As to claim 21, Doberstein, Hudson, and Guey disclose all the subject matters claimed in claim 19, except that symbol determination means determines a symbol based on the receiving power of the antenna. Bruekers discloses a communication system comprising a bit derivation circuit (interpreted as symbol determination) 17 that converts the energy level of the bands (it has been interpreted as the received signal power at the antenna) into a binary value (see paragraph 0055). It would have been obvious to one of ordinary skill in the art at the time of invention to modify the symbol decision unit disclosed by Doberstein as suggested by Bruekers to perform a robust verification of data (see paragraph 0006).

13. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Doberstein, Hudson, Guey, and Subramanian, further in view of Bruekers.

As to claim 22, Doberstein, Hudson, Guey, and Subramanian disclose all the subject matters claimed in claim 20, except that symbol determination means

determines a symbol based on the receiving power of the antenna. Bruekers discloses a communication system comprising a bit derivation circuit (interpreted as symbol determination) 17 that converts the energy level of the bands (it has been interpreted as the received signal power at the antenna) into a binary value (see paragraph 0055). It would have been obvious to one of ordinary skill in the art at the time of invention to modify the symbol decision unit disclosed by Doberstein as suggested by Bruekers to perform a robust verification of data (see paragraph 0006).

14. Claims 23, 24, 25 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barker et al. (hereafter, referred as Barker) (US 2002/0067309), in view of Doberstein.

As to claims 23 and 27, Baker discloses a method comprising: transmitting an information known by both radio stations from the second radio station to the first radio station (see paragraph 0022); estimating a propagation parameter, which is a parameter of a propagation channel shared only between the first radio station and the second radio station, based on the known information and received information transmitted from the second radio station by the first radio station (see paragraph 0022); transmitting a data from the first radio station to the second radio station by superimposing the transmitting data including the data which requires a high quality of service in term of error rate (e.g. confidential data) on the estimated propagation parameter (see paragraph 0023). Baker discloses all the subject matters claimed in claims 23 and 27, except for calculating a plurality of propagation parameters that are obtained from receiving signals of a plurality of antennas in the second radio station; and

reconstructing the transmitting data based on a plurality of propagation parameters calculated by the second radio station. Doberstein discloses calculating a plurality of propagation parameters that are obtained from receiving signals of a plurality of antennas in a second radio station (see column 6, lines 27-34); and reconstructing the transmitting data based on a plurality of propagation parameters calculated by the second radio station (see Fig. 6, block 616). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Barker as suggested by Doberstein to overcome the effects of the channel impairments and reconstruct the original information signal (see column 1, lines 30-35).

As to claim 24, Baker discloses a method comprising: transmitting an information known by both radio stations from the second radio station to the first radio station (see paragraph 0022); estimating a propagation parameter, which is a parameter of a propagation channel shared only between the first radio station and the second radio station, based on the known information and received information transmitted from the second radio station by the first radio station (see paragraph 0022); transmitting a data from the first radio station to the second radio station by superimposing the transmitting data including the data which requires a high quality of service in term of error rate on the estimated propagation parameter (see paragraph 0023). Baker discloses all the subject matters claimed in claim 24, except for calculating a plurality of propagation parameters obtained from receiving signals of a plurality of antennas in the second radio station; and reconstructing the transmitting data based on the a plurality of propagation parameters calculated in the second radio station. Doberstein discloses

calculating a plurality of propagation parameters that are obtained from receiving signals of a plurality of antennas in a second radio station (see column 6, lines 27-34); and reconstructing the transmitting data based on a plurality of propagation parameters calculated by the second radio station (see Fig. 6, block 616). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Barker as suggested by Doberstein to overcome the effects of the channel impairments and reconstruct the original information signal (see column 1, lines 30-35).

As to claim 25, Doberstein further discloses that the propagation parameter estimation means estimates a propagation parameter for each of the sub-carriers (see block 618 and claim 5) and the symbol determination means (see block 616) reconstructs a transmitting data from the receiving signal for each of the sub-carriers.

15. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Baker and Doberstein, further in view of Vook.

As to claim 26, Barker and Doberstein do not expressly disclose that the sub-carriers are any one of an OFDM signal that is so configured as to be mutually-orthogonal in a frequency space. Vook discloses a communication system comprising propagation parameter estimation means (see Fig. 2, block 208) for estimating a propagation parameter from a receiving signal; and a symbol determination means (see blocks 202 and 206) for reconstructing a transmitting data based on the propagation parameter. Vook further discloses that there is a carrier separation means for separating the receiving signal wherein the sub-carriers are any one of an OFDM signal that is so configured as to be mutually-orthogonal in a frequency space (see the

abstract and Fig. 4). It would have been obvious to one of ordinary skill in the art at the time of invention to use OFDM technology as suggested by Vook to increase the performance of the communication system.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leila Malek whose telephone number is 571-272-8731. The examiner can normally be reached on 9AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Leila Malek
Examiner

Art Unit 2611

L.M.

MOHAMMED GHAYOUR
SUPERVISORY PATENT EXAMINER